

## FACTORS AFFECTING THE SPACE UTILISATION RATE OF MALAYSIAN PUBLIC UNIVERSITIES

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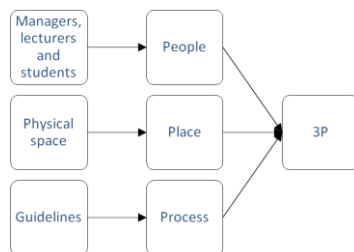
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### Graphical abstract



### Abstract

This paper shares the factors that affect space utilization rate in the Malaysian public higher education institutions. The factors, which gathered through a qualitative study involving academics and practitioners are, people, place and process. This helps the Malaysian public universities to understand what they can afford to put forward in order to achieve higher space utilization. Besides, academics and practitioners are encouraged to explore how space utilization can be embraced as a tool in managing space, especially for public higher education institutions in a developing country such as Malaysia.

**Keywords:** Space utilization, people, place and the process, public universities

### Abstrak

Kertas kerja ini berkongsi faktor-faktor yang mempengaruhi kadar pemanfaatan ruang di pusat pengajian tinggi awam Malaysia. Faktor-faktor yang diperolehi melalui kajian kualitatif yang melibatkan ahli akademik dan pengamal adalah, orang, tempat dan proses. Ini membantu pusat pengajian tinggi awam Malaysia untuk memahami apa yang mampu mereka lakukan untuk mencapai pemanfaatan ruang yang lebih tinggi. Selain itu, ahli akademik dan pemain industri digalakkan untuk meneroka bagaimana kajian pemanfaatan ruang boleh dimanfaatkan sebagai alat untuk menguruskan ruang, terutama bagi pusat pengajian tinggi awam.

**Kata kunci:** Pemanfaatan ruang, manusia, tempat dan proses, universiti awam

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## 1.0 INTRODUCTION

Space utilization in higher education institutions (HEIs) received considerable attention as early as in the 1920s through a research conducted in United States.<sup>30</sup> This research expanded to United Kingdom (UK) circa 1960s.<sup>30</sup> Space utility became a concern for universities because the need for space in HEIs grew in tandem with the increasing number of students. In Malaysia, the first research related to space utilization was back in 1998. However, due to the lack of academic research in this area, there is a dearth of the related literature to draw on.<sup>1, 11</sup>

## 2.0 SPACE UTILIZATION SURVEY

Space utilization survey (SUS) is a process to measure the level of space utilization.<sup>17, 18</sup> This definition can be expanded to include a process that measures the level of space usage based on the frequency of space usage by Ahmadfauzi<sup>1</sup>, and it has also been accepted in US<sup>32</sup> and UK.<sup>30</sup> Thus, SUS can be defined as a process to measure the level of space utilization based on the frequency rate of occupancy at one time.<sup>3, 9-10, 12-16, 18-19, 21-22, 27-30, 32, 34.</sup> Therefore the discussion in this paper will follow the definition which states that space utilization consists of occupancy rate and frequency rate.

## 2.1 Factors Affecting the Space Utilization Rate

A number of factors affecting space utilization rates identified and the discussion about them divided into three types of rate. They are factors that affect the rate of space utilization, the frequency rate of space usage as well as the rate of space occupancy. Factors that affect the implementation of SUS have been discussed earlier. The rate of space utilization is a rate that is obtained through the rate of space usage frequency and rate of space occupancy.<sup>19, 30, 32</sup> This research shows that the rate of space usage frequency is more dominant than the occupancy rate, then it is considered that the rate of space occupancy is positively affected than the rate of utilization and vice versa.<sup>30, 32</sup>

There were also situations where the rate of space usage frequency considered as the rate of space utilization<sup>1</sup>, and this accepted in the United States<sup>32</sup> as well as in United Kingdom.<sup>19, 30</sup> In this case, the rate of space usage frequency is the rate of space utilization. Nevertheless, for this study, the scope for utilization rate expanded to include the rate of space usage frequency and the rate of space occupancy. Thus, the factor that affected the utilization rate discussed based on the rate of space usage frequency and the rate of space occupancy.

## 2.2 Factors Affecting the Frequency Rate

The rate of space usage frequency is the percentage of the total hours of use of a room in a week compared to the actual number of hours that could be offered. Thus, in general, it involves the total hours of using maximum space in a week and the total hours of using the actual space in a week. From that, it appears that it is affected by several factors such as management factors, user factors and factors of the space itself based on the guidelines by NAO<sup>19</sup>, SCHEV<sup>32</sup>, previous studies by Ahmadfauzi<sup>1</sup>, PHB<sup>21-25</sup>, Sharp<sup>33</sup>, Shahril<sup>13-14</sup>, Shahril et al.<sup>15</sup>, and Shahabudin et al.<sup>29</sup>

We can associate the management factor with the senior management, middle management and the implementation level. For example, the senior management in UTM is the Committee of University Management while the Academic Management Division (AMD) is the middle management and the implementation level. The Academic Management Division is placed under the faculty/ department as discussed by PHB<sup>21-25</sup>, Shahril<sup>13-14</sup>, Shahril et al.<sup>15</sup>, and Shahabudin et al.<sup>29</sup>

If all three levels do not explicitly state the maximum number of hours for the spaces under their dependents, it would be hard to increase the utilization level.<sup>13-15, 19, 21-22, 29-30, 32</sup> Hence, the management factor seen as in affecting the rate of utilization. In UK, the senior management has established the total maximum hours to their spaces.<sup>19, 30</sup> Most of the average hours that specified, based on the type of spaces; spaces function as well as the strategic plan such as cost savings<sup>19, 30</sup>

Next, from the perspective of the users, there were cases where a few spaces that have been set up became their favorite spaces.<sup>2, 13-15, 19, 21-22, 29-30, 32</sup> For example, if the learning and teaching spaces are located near the lecturer's room, usually it would become the class for the lecturer and students. Likewise, for the students, they tend to use a specific location factor space and normally they will be using the space.<sup>13-15, 29</sup>

Finally, the space factor itself, whether it is in the location or the equipment available, has affected the rate of space usage frequency.<sup>1, 13-15, 19, 21-22, 29-30, 32</sup> The except in a situation where the lecture timetable has been prepared by the HEIS management or the faculty/ department that wouldn't allow any particular space to be used by the lecturers or the students but for the purposes of temporary activities only. Examples of temporary activities are replacement classes, briefings, discussions or meetings.

In this case, limited equipment and capacity as well as the non-flexible space size would limit the usage of a particular space.<sup>1, 13-15, 19, 21-22, 29-30, 32</sup> Hence, such matters should be considered in order to increase the rate of space usage frequency for a particular space or for a space as a whole.

## 2.3 Factors Affecting the Occupancy Rate

Similar with the rate of space usage frequency, the occupancy rate is also affected by three factors: management, the user and the space.<sup>1, 13-15, 19, 21-22, 29-30, 32</sup>

Firstly, the decisions made by the management regarding enrolment affect the rate of space usage. However, it appears that the enrollment of students usually cannot be fixed to the availability and ability of the existing space.<sup>13-15, 21-22, 29</sup> and this is something difficult to implement. It is rare that the students' enrollment is determined based on the existing of physical resource space.<sup>1, 13-15, 21-22, 29</sup>

Decisions relating to student enrolment rests with the senior management. At times the faculty or department faced great challenges in accommodating the number of student admissions as decided upon by the senior management. As a result, in some sessions, the used spaces exceed the available spaces.<sup>1, 13-15, 19, 21-22, 29-30, 32</sup> If the students' enrollment is low, then the rate of space occupancy would be decreased and vice versa. This is proportionate to the factor of users that also affects the rate of space occupancy.<sup>13-15, 19, 21-22, 29-30, 32</sup> For example, if in one semester, the students undergo industry training, and then the occupancy rate would decrease because of the lack of usage and occupancy.<sup>13-15, 21-22, 29</sup> Thus the number of students affects the occupancy rate.<sup>13-15, 21-22, 29</sup>

Secondly, space users influence the rates in a number of ways. For example, if lecturers were given the chance to determine the spaces that could be used, thus the method of adjusting the number of students with the space capacity, will affect the

occupancy rate of a particular space.<sup>13-15, 21-22, 29</sup> To further illustrate, a lecturer has two sessions of students scheduled to be taught at different periods using the space that has higher capacity from the number of students. This would make the occupancy rate go down. However, if the lecturer combines the students from different sessions into one session in a space, which could accommodate both sessions of the students, surely the occupancy rate of the space will increase.<sup>13-15, 21-22, 29</sup>

Next, the space itself could affect occupancy rate. This is because a large size of space occupied by a small group of students would drag down the occupancy rate. Additionally, besides the location of the room, the lack of room equipment always contributes to the lower occupancy rate.<sup>1, 13-15, 19, 21-22, 29-30, 32</sup>

After discussing the factors affecting the rate of utilization, it was noted that there are three main factors: human, places and processes. Hence, to observe the relation between these factors that earlier; concluded that it has affected by the 3P factors. All of these will be related to the second study objective that is identifying the factors that are affecting the rate of utilization.

### 3.0 OBJECTIVES, SCOPE OF STUDY AND METHODS

This study involved academics and industry players, and focused on space management personnel in UTM as well as from other Malaysian public HEIs. The objective for this study is to determine the factors that affected the utilization rate (%UFO), frequency rate (%F) and the occupancy rate (%O) for all the spaces used in academics.

The methodology used is a qualitative approach. Three interviews and six focus group discussions (FGDs)<sup>2, 4-8, 13-15, 18, 26, 31, 36, 35-39</sup> carried out as data collection methods. For the first objective data collection, literature review, expert interview, and two FGDs used. In the first FGD eight academics, an industry player, four PhD candidates and a Master's students participated. This followed by five academics of multiple Malaysian universities for the second FGD. Following that, the third FGD of this study conducted as a data collection of the second objective. It involved the first FGD participants. After that, the fourth FGD conducted with participation from twenty-four members of Directors of Works Council of Malaysian Public Universities/ *Majlis Mesyuarat Pengarah-Pengarah Pembangunan IPTA (MPPIPTA)* of seventeen Malaysian public HEIs. This followed by interviews with on field experts before the fifth FGD took place, which involved the same participants from the first and third FGD. To validate the findings, a FGD and a group interview conducted. The data were analyzed using content analysis which inductively grouped several statements of respondents into thematic groups.<sup>2, 4-8, 13-15, 18, 26, 31, 36, 35-39</sup>

## 4.0 RESULTS AND DISCUSSION

Although there is a difference between the interview method and FGDs in the implementation of the study, there is similarity in discussing the result<sup>13-14, 15</sup> that is, to put forward the discussion according to the theme that has been set up during the interview session and FGDs. This is important in order to answer the second study objective that is to identify the factors that affected the %UFO pattern. Five main factors identified: senior management, management at the faculty level (middle management), lecturers, students and the physical spaces. The following paragraphs will discuss the factors that affected the %F and %O; the components of %UFO. At the end of the discussion, it would be concluded to become factors that affected %UFO the most.

### 4.1 Factors that Affects the Occupancy Rate (%O)

As mentioned earlier, the discussion for the findings of the factors affecting %O is based on five groups of factors: senior management, management in faculty/ department, lecturers, students and the physical space itself. The findings are similar to previous reports.<sup>1, 13-15, 19, 21-22, 29-30, 32</sup>

#### 4.1.1 Senior Management

Top management factors could be associated with the top management of the HEIs. Student intake is based on the strategic plan of the Ministry of Higher Education (KPT). This means, the admission of students in HEIs will not consider the available space in their institutions. This is because there is no policy, circular and guidelines from the university in targeting the %O in a university.

However, when a university qualifies as a research university (RU), they will surely have their own target in enhancing the number of students especially students that come from postgraduates level. Thus, the %O of space in university will increase. This also applies to the new universities that upgraded from technical colleges to University Colleges.

Other than that, factors that could affect the %O in one particular time include the requirement that students' attendance be more than 80% during the semester. This has an influence to affect the %O. However, it still depends on the capacity of a space. For example, should the attendance for the whole semester be 100%, but the space where the lecture took place has twice the capacity than the registered students, it could not achieve 100% occupancy rate. Vice versa, it will increase the %O when the capacity of a particular space for all the lectures conducted there is near to the size of the class.

#### 4.1.2 Management of Faculty/ Department

Students' enrollment based on the strategic plan from the HEI has also affected the %O of the faculty.

The reasons that the faculty finds it very difficult to adjust the number of students that need to be enrolled with the available capacity. This will last until the students begin their studies because the number of students for a subject depends on the number of students that admitted to the study program. The existing space is difficult to be filling if the number of students admitted is certainly less, and vice versa. If the number of students enrolled in the HEI is exceeding the capacity provided in faculty/ department.

#### 4.1.3 Lecturers

From the interview and FGD sessions conducted, it has been confirmed that lecturers also could contribute to the increase and decrease of %O for a space. This can happen in cases where the lecturer limited the number of students who could join the subject as an excuse to maintain the quality of learning and teaching. Usually, in this case, the lecturer will divide a class, which has a higher number of students into two or three sessions. Each session will be done in separate. Therefore, originally the class that could contain 100 students will be held in a room with the capacity of 100 students but then divided into two sections, so the %O of the space will decrease.

#### 4.1.4 Students

Students, play an important role in affecting the %O through their attendance in the class. Other than that, students also could affect the %O by registering the subject according to the education syllabus without considering adding other subjects. An additional subject is encouraged by the HEI through a minor program that could enhance their knowledge values. Next, students who did not complete the studies within the prescribed period, and would have to repeat the subjects, will also affect the %O.

#### 4.1.5 Physical Space

The physical space or the space capacity which is disproportionate to the number of students is seen as a factor that could affect the %O. The reason is that if the capacity of the space is nearly the same as the number of students in one lecture session, it will increase the %O of the space. Otherwise, if the space capacity is exceeding the number of students, so it could lower the %O of the space. This related to the difficulty of the management of the faculty/ department to coordinate the available spaces with the total number of registered students.

### 4.2 Factors that Affects the Frequency Rate (%F)

After scrutinizing the five groups of factors that affects the %O, it can be concluded that top management, management of faculty/ department,

lecturers, students and physical space are considered for %F. Previous research NAO<sup>19</sup>, SCHEV<sup>32</sup>, Ahmadfauzi<sup>1</sup>, SMG<sup>30</sup>, PHB<sup>21-22</sup>, Shahril<sup>13-14</sup>, Shahabudin<sup>29</sup> and Shahril *et al.*<sup>15</sup> outline the same output. The details of findings are as lined in sections 4.2.1 through 4.2.5.

#### 4.2.1 Top Management

Based on the interview and FGD sessions, it was found out that the awareness from the top management of the HEI in space management plays an important role to enhance the %F of a space. Until now, the HEI management is still in its early stages of managing the space efficiently and effectively. There's no specific policy for the %F that needs to be achieved by faculty/ department. Apart from that, formation of a new HEI strategic plan as an RU will increase the learning and teaching activities and P&I. The increase in the activity has added the %F for some faculties/ department.

#### 4.2.2 Faculty Management/ Department

The faculty / division are capable of affecting the %F when they formed a strategic plan based on the needs of the institution. With the strategic plan, the learning and teaching and P&I activities will increase and enhance %F. However, the scenario is only seasonal because most of the activities will only take place with high %F rate on the first four months of one semester. Meanwhile, the peak of space occupancy has been detected early in the semester, mid-semester (test period) and the end of semester (Exam period).

Apart from it, staff that organizes available space lack of background of space management. They regulate the use of space based on experiences and guidance of senior staff. In addition to that, there is situation in faculty/ department, the staff that manages the schedule and the spaces are different staffs. This could affect the %F of a space whether to increase or decrease the rate when there's no space information being organized. They also have to fulfill the request of lecturers who set their own timetable due to certain constraints.

Furthermore, the faculty/ department is seen as to not taking any initiative to lease out the available spaces during the semester break, this has caused all the spaces are left not to be used in that period. Usually during semester break, few faculties / department will be using the spaces for rent or for lecture session to those taking extra semester or short semester.

#### 4.2.3 Lecturers

The scenario of lecturers combining and dividing the class into fewer sessions is seen as a factor that could affect %F of a space. This is related to the space capacity. Combining the class could decrease the %F and dividing the class section could increase %F

of a space. Other than dividing and merging the class, the scenario of lecturers selecting certain days, period and spaces also contribute to the high and low of %F. This is because, with picking days, period and particular spaces; the high %F will be seen on a particular day and at particular space. Nevertheless, there are lecturers who choose a particular space because they do not have enough information about other spaces, which could be used. The lecturers who are hold administration and research posts other than teaching and learning activities do selecting specific days and time.

#### 4.2.4 Students

Next, student's registration to pursue the subjects according to syllabus limits the number of classes and space usage. Other than that, student's mobility between intervals did not encourage the class held on other faculty/ department if they want to take advantage of available spaces in other faculty or to accommodate the lack of spaces in their own faculty. If there are students who are undergoing the minor program during their study, % F can be added as it would increase the number of lectures and use of space. In addition, students who are not in campus due to their industrial training will contribute to less %F. This is similar to the situation where the postgraduate's research activities surpass the T&L and because of this, the lecture room occupancy will be low. Furthermore, the scenario of students did not take advantage of the semester break as an extra semester could lower the %F.

#### 4.2.5 Physical of the Space

Lastly, %F could be affected by physical space itself. This is because, the total spaces that are limited usually increase the existing %F. Apart from that, some of the spaces couldn't be used continuously in a day such as the engineering laboratory. Also included in the physical aspects is the space design. Designs those are not suitable for various T&L activities will decrease the space's %F. In addition to the design, space capacity is among the key factors in the physical aspects affecting % F space of a room. In addition, the equipment of a room is also a factor often used to determine whether it has been used or not. Typically, a well-equipped space for R&D activities will achieve a relatively high % F rather than spaces which possessed the limited T&L equipment.

#### 4.3 Factors that Affects the Space Utilization Rate (%UFO)

Based on the discussion, it can be concluded that the factors that affect %UFO are the 3P factors. First P representing people/ human, the second factor is the place / space and the last is process/ processes. All the factors discussed above grouped into specified 3P factors. Managers, lecturers and students can be categorised under the human

factor. While the physical space can be loaded under space factor, and finally, guideline factors that not provided by appropriate senior management would fit under the process factors.

## 5.0 CONCLUSION

This paper discusses the findings of the study to determine the factors that affect the space utilization rates. The factors are: the management (whether in the ministry, their institution or faculty/ division itself), the user (number of lecturers and students) as well as the space itself (conditions/ equipment/ capacity/ location). All these factors are consistent with those from previous research or studies reported by NAO<sup>19</sup>, SCHEV<sup>32</sup>, Ahmadfauzi<sup>1</sup>, SMG<sup>30</sup>, PHB<sup>21-22</sup>, Shahril<sup>13-14</sup>, Shahabudin<sup>29</sup> and Shahril *et al.*<sup>15</sup> As such, these findings offer indications of the causes that affected the level of R&D space utilization at the HEIs. The existing factors used as the starting point for the establishment of enhanced space management in the HEIs through space utilization. To achieve that, the development of a space utilization model for Malaysian higher education institutions is crucial and has a firm stand to be carried forward as a further research.

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